

CLAIMS

What is claimed is:

1. A method of delivering a fastener to a workpiece, the method comprising the steps of:

5 (a) disposing an automated machine and a fastener feed unit adjacent a first surface of the workpiece such that an electromagnetic clamping device of the automated machine is against the first surface;

(b) transmitting a signal to a control system of the fastener feed unit, the signal comprising a request for at least one fastener;

10 (c) positioning an unloading mechanism adjacent a fastener storage device within the fastener feed unit;

(d) removing at least one fastener from the fastener storage device and securing the fastener within the unloading mechanism;

15 (e) positioning the unloading mechanism adjacent at least one delivery conduit; and

(f) causing the control system to deliver the fastener through the delivery conduit, through the automated machine, and into the workpiece.

20 2. The method according to Claim 1 further comprising supporting the automated machine and the fastener feed unit on a guide structure extending along the first surface of the workpiece and moving the automated machine and the fastener feed unit along the guide structure to position the automated machine and the fastener feed unit proximate a location where the fastener is to be installed.

25 3. The method according to Claim 1, wherein the automated machine and the fastener feed unit are moved along the guide structure by a powered drive system.

30 4. The method according to Claim 1 further comprising the step of activating a pneumatic source to remove the fastener from the fastener storage device and deliver the fastener through the delivery conduit.

5. A method of delivering a fastener to a work piece, comprising:

(a) positioning a computer controlled machine having at least one tool adjacent a first side of said work piece;

5 (b) disposing said computer controlled machine for movement along said work piece;

(c) moving said computer controlled machine to a desired location on said work piece where a work operation is to be performed on said work piece;

10 (d) delivering a desired type of fastener from a fastener supply source to said computer controlled machine;

(e) using the computer controlled machine to generate a locating signal;

(f) positioning a hand held device manipulated by an individual on a second side of said work piece;

15 (g) using the locating signal to enable the individual to position the hand held device at the desired location;

(h) using the computer controlled machine to generate a magnetic signal that clamps the hand held device to the second side of the work piece at the desired location; and

20 (i) using the computer controlled machine to perform said work operation at said desired location.

6. The method of claim 5, further comprising using said hand held device to generate a signal to enable said hand held device to communicate with
25 said computer controlled machine.

7. The method of claim 5, further comprising using a fastener feed mechanism for selecting specific types of fastening members from a plurality of differing types of fastening members.
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8. The method of claim 7, further comprising disposing said fastener feed mechanism adjacent said first side of said work piece for movement along said first side of said work piece.

9. The method of claim 8, further comprising using a pneumatic system for withdrawing ones of said fastening members from said fastener feed mechanism.

5 10. The method of claim 8, further comprising using a conduit to couple said fastener feed mechanism to said computer controlled machine, and supplying desired types of fasteners to said computer controlled machine.

10 11. The method of claim 5, further comprising supporting said computer controlled machine on guide rails positioned closely adjacent said first side of said work piece.

15 12. The method of claim 8, further comprising supporting said fastener feed mechanism along at least one guide rail disposed closely adjacent said first side of said work piece.

13. A method of delivering a fastener to a work piece, comprising:

(a) positioning a machine having at least one tool adjacent a first side of said work piece;

5 (b) disposing said machine for movement along said work piece in a manner that maintains the machine traveling in a plane parallel to said first side of said work piece;

(c) moving said machine to a desired location on said work piece where a work operation is to be performed on said work piece;

10 (d) delivering a desired type of fastener from a fastener supply source to said machine; and

(e) positioning a hand held device manipulated by an individual on a second side of said work piece; and

15 (f) communicating between the machine and the hand held device such that both are positioned in alignment with one another at said desired location; and

(g) when both of said machine and said hand held device are positioned at said desired location, using said tool of said machine and said hand held device to cooperatively perform said work operation on said work piece.

20 14. The method of claim 13, wherein said machine communicates with said hand held device via a wireless signal.

25 15. The method of claim 13 further comprising using said machine to generate a magnetic signal that serves to clamp said hand held device to said second side of said work piece.

30 16. The method of claim 13, wherein delivering a desired type of fastener from said fastener supply source comprises using a fastener supply mechanism in communication with said machine via a conduit to supply said desired type of fastener, through said conduit, to said machine.

17. The method of claim 13, further comprising supporting said fastener supply source for movement along said first side of said work piece.

18. The method of claim 18, further comprising supporting said fastener supply source along at least one guide rail for movement along said plane, in concert with movement of said machine.

19. A method for performing a work operation on a work piece, comprising:

(a) positioning a computer controlled machine having at least one tool adjacent a first side of said work piece;

5 (b) disposing said computer controlled machine for movement along said work piece in a manner that maintains the machine traveling in a plane parallel to said first side of said work piece;

(c) moving said computer controlled machine to a desired location on said work piece where a work operation is to be performed on said
10 work piece;

(d) communicating between said computer controlled machine and an implement supply source, wherein a specific type of implement is requested by said computer controlled machine from said implement supply source, and wherein said implement supply source maintains a reservoir of
15 differing types of implements;

(e) delivering at least one of said specific type of implement from said implement supply source to said tool of said computer controlled machine when requested by said computer controlled machine;

(f) communicating locating signals between said computer
20 controlled machine and an operator manipulated tool positioned on a second side of said work piece;

(g) using said locating signals to align said tool of said computer controlled machine with said operator manipulated tool at said desired location on said work piece; and

25 (h) using said tool of said computer controlled machine in concert with said operator manipulated tool to supply said specific type of implement to said work piece at said desired location.

20. The method of claim 19, further comprising disposing said
30 implement supply source for movement along said first side of said work piece.

21. The method of claim 19, further comprising delivering said specific type of implement from said implement supply source to said computer controlled

machine via a conduit coupled between said implement supply source and said computer controlled machine.

22. The method of claim 21, wherein communicating locating signals
5 comprises using wireless signals to communicate between said computer controlled machine and said operator manipulated tool.

23. A method for performing a work operation on a work piece, comprising:

(a) positioning a computer controlled machine having at least one tool adjacent a first surface of said work piece;

5 (b) disposing said computer controlled machine for movement along said first surface of said work piece;

(c) moving said computer controlled machine to a desired location on said work piece where a work operation is to be performed on said work piece;

10 (d) communicating between said computer controlled machine and an implement supply source, wherein a specific type of implement is requested by said computer controlled machine from said implement supply source, and wherein said implement supply source maintains a reservoir of differing types of implements;

15 (e) delivering said specific type of implement from said implement supply source to said tool of said computer controlled machine when requested by said computer controlled machine;

(f) communicating locating signals between said computer controlled machine and an operator manipulated tool positioned on a second surface of said work piece;

20 (g) using said locating signals to facilitate cooperation between said tool of said computer controlled machine and said operator manipulated tool in performing said work operation on said work piece at said desired location on said work piece; and

25 (h) using said tool of said computer controlled machine in concert with said operator manipulated tool to supply said specific type of implement to said work piece at said desired location.

24. The method of claim 23, further comprising disposing said
30 implement supply source for movement adjacent said first surface of said work piece.

25. The method of claim 23, further comprising using wireless signals to communicate between said computer controlled machine and said operator manipulated tool.

- 5 26. The method of claim 23, further comprising using said computer controlled machine to generate a magnetic signal in the vicinity of said desired location.